

The State of Ethnoprimateology: Its Use and Potential in Today's Primate Research

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Abstract The human–primate interface is an increasingly relevant theme in primatological research. To understand the extent of ethnoprimateological studies in contemporary primatology, we explored 7 years of primatological literature through a systematic review. We reviewed original research papers published in the *American Journal of Primatology*, the *International Journal of Primatology*, *Primates*, and *Folia Primatologica* between January 2010 and December 2016 for the presence of 14 search terms relevant to the ethnoprimateological approach. We sorted research papers into topical categories to identify trends in the recent primatological literature. Of the 1551 papers that met the criteria for inclusion in this review, 12 papers (0.8%) self-identified as an ethnoprimateological study by using the term in the title or keywords, and only 17 papers (1.1%) used the term anywhere in their text. However, the presence of other relevant keywords—*anthropogenic* (16.3%), *crop* (9.1%), *disturbance* (18.7%), *conflict* (6.2%), *human–nonhuman* (0.5%), *human–primate* (1.0%), *interface* (1.5%), *perception* (2.5%), *culture* (2.6%), *ethnography* (0.1%), *trade* (6.8%), *provision* (16.1%), and *tourism* (4.6%)—in a variety of research papers suggests that the human–primate dimension is salient for many, if not most, areas of primatological interest. The ethnoprimateological approach is relevant to every research trend we identified in today's primatology. We highlight existing literature that exemplifies ethnoprimateological engagement and present potential research questions in each area, demonstrating that primatology as a whole would benefit from greater attention to the human dimension.

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Introduction

Over the last few years, the discourse around ethnoprimateology has shifted. Scholars previously highlighted its growth trajectory, calling it an “emerging practice” (Malone *et al.* 2014, p. 8) or “emerging discipline” (Lee 2010, p. 1) and an “increasingly popular approach to primate studies in the twenty-first century” (Fuentes 2012, p. 101; Riley 2013). Ethnoprimateology is no longer “emerging”; it has arrived, and is now a necessity for contemporary primate research (Fuentes *et al.* 2017, p. 1; Riley *et al.* 2017). While this relevant and important approach is becoming well known, its novelty and mixed-methods toolkit has led to the question: What counts as “ethnoprimateology?” The answer requires a broad and reflexive literature review that considers ethnoprimateology’s trajectories of development and potential for future growth.

Studies classified as “ethnoprimateology” include all manner of conflict and cohabitation between humans and primates, including parasite and disease transmission (Fuentes 2010; Jones-Engel *et al.* 2005), ecotourism (Grossberg *et al.* 2003; Maréchal *et al.* 2011), and urban and agricultural conflicts (Hill 2005; Riley and Priston 2010). Several excellent reviews (Fuentes 2012; Lee 2010; Riley 2013), case studies (Malone *et al.* 2014; Riley and Fuentes 2011), special issues (Fuentes and Hockings 2010; McLennan *et al.* 2017), and edited volumes (Dore *et al.* 2017; Paterson and Wallis 2005; Waller 2016) illustrate the breadth of research within this topic. Ethnoprimateology is one of many fields increasing in importance because of its incorporation of anthropogenic influences (e.g., human–wildlife relations, conservation biology, climate change studies), but it is set apart by its focus on the human–primate interface itself and the mixed-methods toolkit often used to assess this interface (Dore *et al.* 2017; Setchell *et al.* 2017). The result is that a spectrum of primatologically or ethnographically focused research projects (which vary in their use of primatologically or ethnographically focus methods) falls under the umbrella of ethnoprimateology. Work on primate–tourist interactions, for example, is classified as ethnoprimateology because it considers the impact of humans on primates, despite its lack of qualitative or ethnographic methods (McKinney 2014; Westin 2017). These factors directly contribute to confusion about what gets classified as “ethnoprimateology.” It is clear from the literature that this work shares a common goal to better understand the spaces (practical, cultural, and theoretical) where humans and primates intersect.

Those who have adopted the ethnoprimateological approach to investigate human–primate relationships have done so to accommodate the growing recognition that human influence on local and global ecologies are norms, not aberrations, in primate lives (Fuentes 2010; Malone *et al.* 2014; Riley 2006; Tutin and Oslisly 1995). Indeed, as “it is becoming increasingly difficult to encounter a primate population free from human influence, the anthropogenic element is relevant to (almost) every primatological study” (Riley 2013, p. 414). Influenced by environmental anthropology, which has long held that there is no such thing as a “natural” environment (Cronon 1996; Eden 2001; Williams 1980), the ethnoprimateological approach does not see anthropogenic impacts as dilemmas; rather, they are opportunities to examine the causes and

consequences of primate behavioral plasticity (Riley *et al.* 2017). Humans are not distinct from their environments; therefore, reframing questions in primate behavioral ecology to incorporate humans and their impacts as part of the broader environment that influences primate behavior increases primatology's cross-disciplinary appeal, firmly placing this approach within a holistic anthropology (Riley 2013). Seeing humans and their impacts as “natural” and attending to the coconstruction and coproduction of primate and human niches provides primatologists with a much more robust and realistic assessment of the factors influencing the behavior of our study species (Fuentes 2010; Jost-Robinson and Remis 2014).

All manner of primatological work—from behavioral ecology to conservation, from disease transmission to life history—can be informed by this explicit consideration of the spaces where humans and primates intersect, but exactly how this interdisciplinary perspective is represented in the primatological literature is currently unclear. To address this question, we first review 7 years of literature to determine the extent of ethnoprimatological studies in today's primatology, recognizing papers that do not self-identify as such but that are clearly working from an ethnoprimatological context. We then describe research trends within primatology journals over this time period to highlight the ethnoprimatological approach in action across broader primatology. Through this process, we further define “ethnoprimatology” and identify opportunities for future engagement with the human–primate interface.

Methods

To explore the prevalence of the ethnoprimatological approach in contemporary primatology, we conducted a systematic review of primate-specific peer-reviewed academic journals. We chose to focus our review on primate-specialist journals for two reasons. First, a Web of Science search for the keyword *ethnoprimatology* indicated that most papers on this topic are published in either edited volumes or primate-specialist academic journals. Second, using only primate-specialist journals provided a window into recent trends in primatology as a discipline. Therefore, we selected the four top-ranked academic journals with an emphasis on primates—the *American Journal of Primatology*, the *International Journal of Primatology*, *Primates*, and *Folia Primatologica*—for inclusion in this review. These journals are not taxonomically or regionally specific, are recognized by primatologists from varied academic disciplines and research interests, and are all well respected biological science publications.

The systematic review included all original research papers published in these journals between January 2010 and December 2016. We chose the beginning of the decade as a starting date for the review, as we wanted a snapshot of contemporary primatology. The end date of December 2016 was determined by the most recent work we could access through our university systems at the time of submission. We excluded brief reports, commentaries, book or website reviews, technical reports, and errata from the review. We also excluded review papers, because by nature they synthesize trends in recent research, and we wished to avoid artificial replication of research foci in the dataset. We included special topical issues but omitted conference supplements. With 7 years' publication across four journals, a total of 1551 research papers met the criteria for inclusion in this review.

For each paper, we recorded basic bibliographical information in a spreadsheet, along with the full title and list of keywords. We then individually explored each paper using the “find text” tool in Adobe Reader XI to search for the presence of specific search terms. We recorded these data as simple yes/no categorical variables: if the term appeared anywhere in the body of the paper, title, keywords, or abstract, it was marked “yes” on the spreadsheet. We excluded search terms appearing within the reference list, acknowledgments, or author affiliation statements, but nowhere else in the paper.

We searched for 14 terms relevant to ethnoprimatological studies: *ethnoprimatology*, *anthropogenic*, *disturbance*, *human–nonhuman*, *human–primate*, *interface*, *conflict*, *perception*, *ethnography*, *culture*, *crop*, *tourism*, *provision*, and *trade*. We recorded papers in which the word *ethnoprimatology* appeared in either the title or the list of key words as being self-identified ethnoprimatological studies. We also searched for the word anywhere in the text of the paper, in the same manner as the other search terms. We recorded all occurrences of search terms within the paper body. However, some terms appeared in contexts that did not relate to the ethnoprimatological approach (e.g., “cell culture” or “parent–offspring conflict”) and we excluded them from discussion. We accepted search terms that appeared as a component of a relevant word (e.g., *tourism* as part of “ecotourism,” or *crop* as part of “crop-feeding”).

To gain a clearer picture of the current scope of primate research, we assigned each paper reviewed to one of nine general categories of study: “anatomy and physiology,” “behavioral ecology,” “cognition and social behavior,” “community ecology,” “conservation and captive welfare,” “genetics,” “life history and reproduction,” “parasites and disease transmission,” and “taxonomy and distribution.” We identified the topical classification of each entry based on the objectives of the papers as described in their abstract, title, and list of keywords. Several sorting rules emerged in the process. Studies of predation (human or nonhuman) fell under “community ecology,” while foraging or hunting behavior by the primates themselves fell under “behavioral ecology.” Papers that used genetic analysis to understand taxonomy fell under “taxonomy and distribution,” but those that focused on genetic diversity within groups were included under “genetics.” With few exceptions, papers on primate evolution fit nicely into either “anatomy and physiology” or “taxonomy and distribution.” While we could have split “life history and reproduction” between “behavioral ecology” (reproductive strategies) and “anatomy and physiology” (growth and development, feeding), there were enough papers on this particular aspect of primate life to warrant its own category.

Ethical Note

No raw data were collected by the authors for the purposes of this paper. However, because all papers reviewed were published in journals that require an ethical statement with regard to animal care protocols, it follows that all research that contributed to this paper was performed in an ethically sound manner.

Engagement with Ethnoprimatology in the Literature

Of the 1551 papers reviewed, 12 papers (0.8%) self-identified as an ethnoprimatological study by using the word *ethnoprimatology* in the title or the keywords, and only 17 of

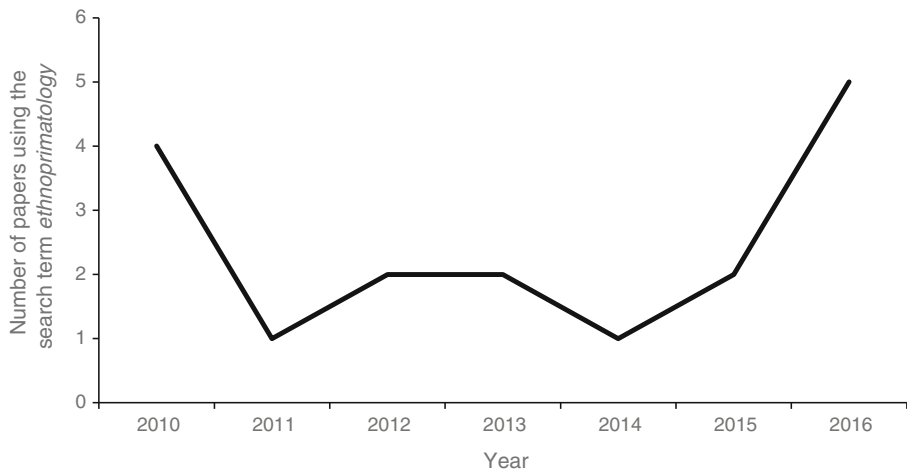


Fig. 1 Number of research papers published in the *American Journal of Primatology*, *Folia Primatologica*, the *International Journal of Primatology*, and *Primates* between January 2010 and December 2016 that used the search term *ethnoprimatology* ($N = 17$).

the papers (1.1%) included in this systematic review used the term *ethnoprimatology* in their text at all. The overt use of the ethnoprimatological approach was low, and did not show a steady increase in frequency over the years included in this systematic review (Fig. 1). However, further exploration of other relevant search terms shows that the ethnoprimatological approach holds an important role in today's primatology.

Each of the papers that included the term *ethnoprimatology* also used at least two other search terms (mean 6, range 2–9); we considered each search term separately and thus the figures described here are not mutually exclusive. *Disturbance* was the most frequently appearing search term (Table 1), used in a context relevant to ethnoprimatology in 290 papers (18.7% of papers reviewed); this accounts for nearly 1 in 5 of all papers published in these primate-specific journals over the 7-year period. The search term *anthropogenic* appeared in 252 papers (16.3%). The term frequently appeared in conjunction with *disturbance*, but when used alone *anthropogenic* often served to introduce the conservation pressures on the study species as a way of highlighting the papers' significance. Research papers using *anthropogenic* and *disturbance* together focused on classic ethnoprimatological topics, such as tourist–monkey interactions (e.g., Aguilar-Melo *et al.* 2013), conservation in fragmented landscapes (e.g., Etiendem *et al.* 2013; Kumara *et al.* 2014), and anthropogenic range restrictions (e.g., Kamilar and Tecot 2016). Several authors compared the health of wild strepsirrhine (e.g., Irwin *et al.* 2010; Junge *et al.* 2011) and haplorrhine primates (e.g., Gómez-Espinosa *et al.* 2014; Schillaci *et al.* 2014) in intact and fragmented forests. Wasserman *et al.* (2013) further embraced the human–nonhuman primate interface by comparing the physiological impact of human capture darting with predation risk in *Procolobus*. Similarly, Beamish and O'Riain (2014) exemplified the ethnoprimatological approach in their discussion of the impact of disability, in most cases caused by chronic human conflict, on *Papio*. They noted that disability may ultimately increase conflict by pushing injured animals into raiding high-return, anthropogenic foods.

Table 1 Number of papers (%) in which search terms appeared in four major primatology journals (2010–2016). Terms are listed in order of frequency in 1551 total papers. Multiple search terms may appear in a single paper

Search term	Number (%) of papers featuring search term	Number (%) of papers in which the term is used in context relevant to ethnoprimateology
Disturbance	352 (22.7)	290 (18.7)
Conflict	269 (17.3)	96 (6.2)
Anthropogenic	252 (16.3)	252 (16.3)
Provision	249 (16.1)	249 (16.1)
Crop	190 (12.3)	141 (9.1)
Perception	115 (7.4)	38 (2.5)
Trade	114 (7.4)	106 (6.8)
Culture	99 (6.4)	40 (2.6)
Tourism	71 (4.6)	71 (4.6)
Interface	59 (3.8)	23 (1.5)
Ethnoprimateology	17 (1.1)	17 (1.1)
Human–primate	16 (1.0)	16 (1.0)
Human–nonhuman	8 (0.5)	8 (0.5)
Ethnography	1 (0.1)	1 (0.1)

The search term *provision* appeared in 249 papers (16.1%). Papers that addressed provisioning included interactions between nonhuman primates and tourists (e.g., Lane-deGraaf *et al.* 2014; Schurr *et al.* 2012) and the living conditions of captive animals (e.g., Reuter and Schaefer 2016; Trayford and Farmer 2013). Addressing the provisioning status of one's study subjects seemed most common for studies conducted in Japanese field sites (e.g., Hadi *et al.* 2013; Sugiyama *et al.* 2011; Suzuki and Suguira 2011), where primatologists have historically worked with managed study populations. Another term associated with feeding was *crop*, which usually appeared as “cropland,” “crop-raiding,” or “crop-foraging.” After removing instances of *crop* in the context of “standing crop method” of nest surveys or of measures of wild fruit crop availability, the term appeared in 141 papers (9.1%). Research on the interactions between wild nonhuman primates and human farmers spanned all major taxonomic groups (e.g., Strepsirrhines: Gabriel 2013; Farris *et al.* 2011; New World monkeys: McKinney 2011; van Kuijk *et al.* 2016; Old World monkeys: Priston *et al.* 2012; Yamada and Muroyama 2010; apes: Campbell-Smith *et al.* 2010; Phillips and Lancelotti 2014). Dickman (2013), clearly working within the ethnoprimateological approach, considered crop feeding as one factor in her comparison of human–primate and human–carnivore conflict. The term *trade* occasionally appeared in reference to social exchanges; 106 papers (6.8%) featured *trade* in a context relevant to the ethnoprimateological approach. While many papers simply mentioned that the commercial animal trade was one threat to the survival of the study species, others were focused primarily on the effects of the pet (e.g., Da Silva *et al.* 2016; Nekaris *et al.* 2010; Reuter and Schaefer 2016) or bushmeat (e.g., Hicks *et al.* 2013; Macdonald *et al.* 2013) trade. *Conflict* often appeared as “parent–offspring conflict” or in discussions of intra- or intergroup interactions. With these removed, *conflict* as it relates to human–primate interactions appeared in 96 papers (6.2%). Exemplars here included explorations

of conservation priorities (Das *et al.* 2011; Kumara *et al.* 2010), interspecies aggression (Hockings *et al.* 2010), and sharing space (Leblan 2016).

All occurrences of the search term *tourism* were relevant to our discussion, with the word appearing in 71 papers (4.6%). These studies focused on the consequences of habituation for ecotourism (e.g., Klailova *et al.* 2010; Morton *et al.* 2013) and the potential for interspecific disease transmission due to anthropogenic effects (e.g., Beisner *et al.* 2016; Bublitz *et al.* 2015; Lane-deGraaf *et al.* 2014). *Culture* was among the most versatile of the search terms, and it appeared in some contexts that were not particularly relevant for the ethnoprimateological approach. After we removed references to “cell culture” and studies concerning primate technology (including tool use) and social traditions, the term appeared in 40 papers (2.6%). Papers discussing culture included work on conservation education (e.g., Dolins *et al.* 2010; Kling and Hopkins 2015; Kuhar *et al.* 2012) and resource management (e.g., Papworth *et al.* 2013; Parathian and Maldonado 2010; Quan *et al.* 2011). *Perception* was used in many papers dealing with communication and sensory perception; it appeared in context in 38 papers (2.5%). Research featuring the term *perception* focused on local people’s knowledge of nonhuman primates (e.g., Ellwanger *et al.* 2015; Sousa *et al.* 2014; Stafford *et al.* 2016).

We chose *interface* as a search term with the phrase “human–nonhuman interface” in mind, but it proved to be a generalized term that rarely appeared within a relevant context. Rather, it was usually used in reference to computing or modeling, anatomical morphology, or hybridization zones. The human–nonhuman primate *interface* was discussed in 23 papers (1.5%), with research on cross-species interactions (e.g., Hicks *et al.* 2012; McLennan and Hill 2010; Riley and Wade 2016) and on describing field research sites in terms of anthropogenic influences (McKinney 2015). *Human–primate* and *human–nonhuman* were both infrequent, appearing in only 16 (1.0%) and 8 papers (0.5%), respectively, many of which have been cited elsewhere in this review. Finally, *ethnography* appeared only once in the 1551-paper sample (0.1%), in a study of land-use conflict among humans, chimpanzees, and elephants (Leblan 2016).

The Importance of the Ethnoprimateological Approach to Broader Primatology

Current Trends in Primatology

“Cognition and social behavior” was the most frequent area of study in recent primate-specific journals (Fig. 2). Papers in this category included studies of social interactions, gestural and vocal communication, and primate cultural traditions. “Behavioral ecology” studies considered diet, ranging, sleeping sites, activity budgets, and other issues of how primates make a living within their physical landscape. “Anatomy and physiology” included papers on the evolution or variation of primate bodies, hormonal responses to stress, and sensory reception. “Life history and reproduction” studies most often focused on either the physiological components of reproduction (e.g., parturition, fecundity, milk content) or on the behavioral features associated with reproduction and fitness (e.g., reproductive strategies, infanticide). This category also included papers on life history theory, growth and development, and senescence. “Community ecology” research included interactions involving the primate study species and their wider

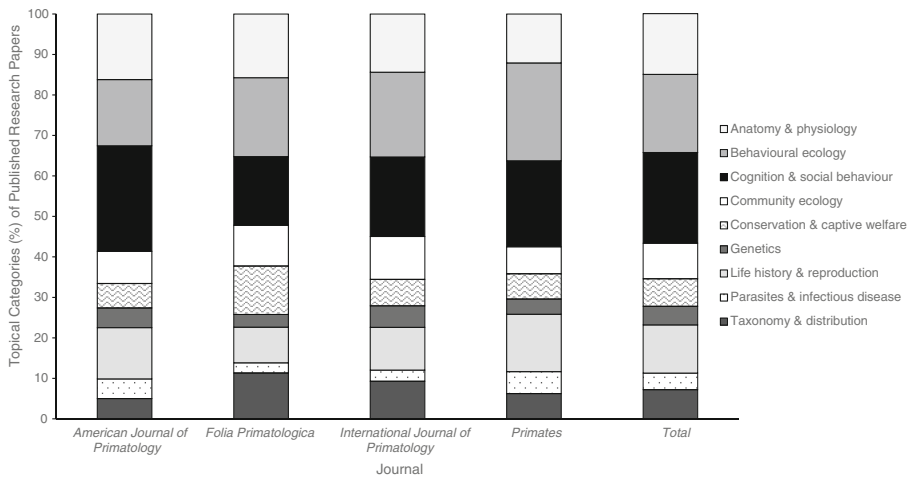


Fig. 2 Topical area of research papers published in the *American Journal of Primatology*, *Folia Primatologica*, the *International Journal of Primatology*, and *Primates* between January 2010 and December 2016.

ecological community. This was represented by studies of predator–prey relationships, niche overlap or specialization, polyspecific associations, and seed dispersal. “Taxonomy and distribution” studies focused on biogeography, phylogenetic relationships of different primate species, and census and population viability analysis. “Conservation and captive welfare” studies focused on threats to nonhuman primate survival in the wild and on maintaining healthy populations in captivity. Papers in the “Genetics” category were dominated by studies on specific genetic variants, the relationship between genes and behaviors, and methodological advances in genetic analysis. Finally, papers in the category “parasites and infectious disease” focused on both endo- and ectoparasites, as well as viral and bacterial diseases affecting wild nonhuman primates.

More than half of the papers published in the four preeminent primatology journals from the years 2010–2016 fell into one of three categories: “cognition and social behavior,” “behavioral ecology,” and “anatomy and physiology.” Of the less popular categories of study, “community ecology” and “genetics” papers were more likely to appear in the *International Journal of Primatology*. Papers dealing with “taxonomy and distribution” and “conservation and captive welfare” were more likely to appear in *Folia Primatologica*, and those on “parasites and infectious disease” were more likely to be published in *Primates*. While most search terms were distributed across every topical category, others were more isolated in specific research areas (Fig. 3). *Ethnoprimatology*, for example, appeared only in papers in the categories of “behavioral ecology,” “community ecology,” “conservation and captive welfare,” and “parasites and disease transmission.” *Human–nonhuman* and *human–primate* were also concentrated, appearing in two and five categories of research, respectively.

The Value of Ethnoprimatology

Even relatively isolated primate communities are influenced by global processes such as climate change, interact with human observers, face anthropogenic disease risks and

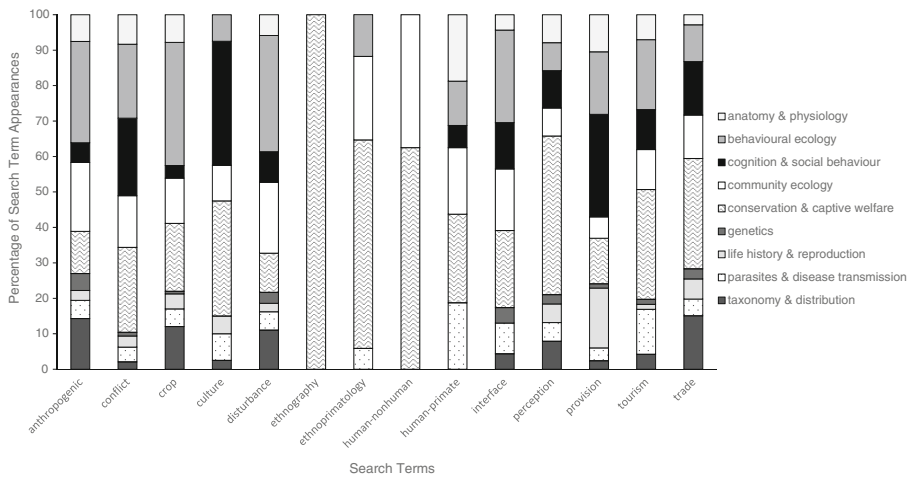


Fig. 3 All occurrences of 14 search terms in a review of research papers published in *American Journal of Primatology*, *Folia Primatologica*, the *International Journal of Primatology*, and *Primates* between January 2010 and December 2016, broken down by the area of study.

habitat alterations, and have important roles to play in human perceptions of nature and conservation. These interconnections must be acknowledged. In the text that follows, we discuss the relevance of the ethnoprimateological approach to each of the research trends in today's primatology, generating potential research questions and highlighting existing literature that exemplifies ethnoprimateological engagement within each research area.

Ethnoprimateology can bring an important perspective to papers on cognition and social behavior. For example, how does the worldview of primatologists influence our interpretation of social interactions among nonhuman primates? How do we impart meaning in animal behavior? It is well known, for example, that women scientists played a major role in shifting perceptions of female primates and our overall interpretations of primate society (Fedigan and Strum 1997; Haraway 1989). In addition, cognitive studies are often performed with captive animals, providing huge potential for studies of the human–primate interface. How do interactions between animals and researchers, or between animals and their caretakers, influence our behaviors and study outcomes? In an ethnoprimateological study of keeper–orangutan interactions at the Auckland Zoo, keepers' empathy for their charges and interpretations of the orangutans' moods directly affected their husbandry practices (Palmer *et al.* 2016).

Ethnoprimateological studies in behavioral ecology actively engage with the anthropogenic aspects of primate environments to document how primate behavioral patterns are influenced by and influence human behaviors. With this vantage point, primate behaviors like crop foraging (Chism 2005; Dore 2017; Hill 2000), use of exotic or invasive species (Wimberger *et al.* 2017), cryptic behaviors (Jost-Robinson and Remis 2014), and attacks on humans (Hockings *et al.* 2010) are better understood when they are contextualized as responses to human presence and impacts on the environment. However, primates are not only passive recipients of human influence; they are active shapers of human environments and behaviors, such as when they alter plant communities (Russo and Chapman 2011), prune trees (Siex and Struhsaker 1999), or generate income for local communities (Fuentes 2010; Ohnuki-Tierney 1987; Sponsel *et al.* 2002).

While they may appear less directly related to the human–primate interface than other topics in our analysis, investigations of anatomy and physiology have many opportunities for involvement with the ethnoprimateological approach. Any habitat modification, perceived threat from tourists, or dietary changes due to crop feeding or provisioning will have a physiological impact for the animals. For example, species show different physiological responses to the same stressors, as shown in sympatric populations of *Alouatta* and *Ateles* surviving in forest fragments (Rimbach *et al.* 2013), illustrating one reason contributing to the varying survival rates of different taxa in anthropogenic landscapes. Studies of nutrient content of crop items, such as cacao (Riley *et al.* 2013) and sweet potato (LaFleur and Gould 2009), can explain how anthropogenic foods affect primate bodies, in addition to providing useful information for farmers seeking to minimize crop damage by wildlife. Likewise, a greater understanding of the relationship between dietary specializations and behavioral flexibility can help us identify the limits of anthropogenic pressure on dietary resources that these vulnerable primate populations can handle (Nowak and Lee 2013).

The ethnoprimateological approach could benefit our understanding of primate life history and reproduction in several ways. Reproduction is a physiological process, and as such is highly dependent on resources and environmental stressors. Availability of high-quality foods has been associated with accelerated growth rates and early onset of sexual maturity in both wild (Altmann and Alberts 2005; Emory Thompson and Wrangham 2007) and rehabilitated primates (Kuze *et al.* 2012). Furthermore, later stages throughout the life cycle may also be influenced by ecological parameters, which are often subject to human manipulation; the increased longevity of captive primates, living without the stressors of predation and resource acquisition, is an extreme example of this relationship. Any human-altered environment could have drastic influences on primate life history—for good or ill—and this relationship deserves further investigation.

As a category of study, community ecology has much to be gained from greater involvement with ethnoprimateology. All too often, humans are removed from the picture despite centuries of ecological sympatry with nonhuman primates in some parts of the world (Fuentes 2010; Tutin and Oslisly 1995). Today, all nonhuman primate communities are undeniably affected by human actions, making us one of the most influential members of the greater ecological communities in which our primate study species live. To ignore these complex interconnections is short sighted. One simple way to remedy this is to consider humans as one facet among many in community ecology studies. Researchers are already broadening our understanding of community ecologies, with investigations of how provisioning affects both the primates and the humans who engage in it (Sengupta and Radhakrishna 2018), the relative vulnerabilities to human hunting across taxa (Linder and Oates 2011), and the reasons humans may harvest wild primates other than for food (Nekaris *et al.* 2010).

Conservation and captive welfare studies can clearly benefit from the ethnoprimateological approach; ethnoprimateology has had a conservation focus from its very roots (Lee 2010; Sponsel 1997). An increase in community-focused conservation is well within the parameters of traditional ethnoprimateology, and is an underused tool for wildlife conservation, economic development, and stakeholder empowerment (Hill 2002). Another important area of focus to bolster is captive care. Palmer and Malone (2017) make a strong argument for how an

ethnoprimateological approach is important to investigations of both people and primates in managed settings.

The long association between humans and primates in tropical regions suggests that we have had a historical influence on primate distributions, which would ultimately affect population structures and possibly even modern taxonomic categories. Historical or ethnographic investigations comparing primate morphology and behavior with their contemporary counterparts could elucidate differences in a species' distribution over time. At present, however, there is a clear association between human geography and primate distribution, especially as it concerns habitat fragmentation (Benchimol and Peres 2013; Leblan 2014; Michalski and Peres 2005).

Genetic analysis can clearly be a useful tool for answering ethnoprimateological questions. However, the relationship at present appears unilateral: while genetics informs ethnoprimateological questions, how can ethnoprimateology inform studies with a primary focus on genetics? Lane *et al.* (2010), for example, show that dynamic, anthropogenic landscapes have shaped the population genetic structure of Balinese macaques. The most promising area for future collaboration between genetics and ethnoprimateology lies in epigenetics. Chronic elevated stress levels caused by conflict and close cohabitation with humans, as well as dietary changes affecting primates in altered landscapes, are likely to have epigenetic consequence. Epigenetic changes have been documented following dietary modifications in laboratory primates (Aagard-Tillery *et al.* 2008; Ma *et al.* 2014), and application of these techniques to wild populations facing a variety of anthropogenic stressors would be enlightening.

The study of host–parasite interactions and bidirectional pathogen transmission as they relate to anthropogenic habitat disturbance is one notable area for engagement with the ethnoprimateological approach. Loudon *et al.* (2017), for example, provide a case study of the influence of human economic relationships with *Propithecus* and the resulting effects on their parasite ecology, and several important papers have documented how variations in the human–primate interface impact zoonotic disease transmission (Engel *et al.* 2006; Jones-Engel *et al.* 2005, 2011). However, several issues could be informed by ethnoprimateology. Studies of viral transmission through bushmeat (Karesh and Noble 2009; Muehlenbein 2016) would be one area of interest. The use of nonhuman primates as laboratory research animals, and how those animals are cared for after the studies have been concluded, would be another appropriate focus for ethnoprimateological studies. Even ectoparasites, such as botflies, are influenced by anthropogenic environmental change and so benefit from a broad ethnoprimateological approach (Westin 2017).

Building an Ethnoprimateologically Engaged Primatology

While one of the goals of this paper is to show the relevance of ethnoprimateology to virtually every area of primatological research, we do not mean to imply that all work on primates must be ethnoprimateological. Primatologists need not be focused on the interface itself to recognize the relevance of human contexts to their research questions. As ethnoprimateology ranges from human- to primate-focused, the human–primate interface can range from integral to peripheral to primatological research questions. Our central argument, rather, is that this interface should never be *missing* from

primatological research, and that the perspective offered by ethnoprimateology is necessary for the advancement of primatology as a discipline.

With such clear relevance to contemporary primatology, one may wonder why ethnoprimateology does not already demand a greater place in primatological research. Some primatologists, for example, may not consider pervasive human influence to be central to primatological questions. As some have noted, this could be a result of resistance on the part of reviewers and funding agencies who do not see the scientific value of studying primates in “unnatural” environments (Fuentes 2010; Fuentes *et al.* 2017), or who are unaware of the extent to which some primates use modified landscapes (Hockings *et al.* 2015). Ethnoprimateology may also be too specific a framework given its focus on primates; many primatologists and ethnographers consider humans’ relationships with *all* animals in their environments, not just primates (e.g., Jost-Robinson and Remis 2014). The growing “biosocial approach” to human–animal relationships (Hill *et al.* 2017), for example, includes ethological and ethnographic methods but is not specific to primates; biosocial investigations of human–primate relationships, however, are often contextualized within an ethnoprimateological framework (e.g., Setchell *et al.* 2017). Finally, because research on the human–primate interface occurs along a spectrum and is conducted with methods and by individuals from multiple disciplines, researchers may question whether their work falls under the umbrella of ethnoprimateology and therefore choose not to define it as such.

As we have shown, however, there is far more activity taking place within the framework of ethnoprimateology than the frequency of the term would suggest. A better question may be how to define the ethnoprimateological approach going forward, and how to engage with it across primatology. Based in part on the results of this review and our own research interests, we define ethnoprimateological research as any research focused on the human–primate interface itself, regardless of whether or not it includes methods from social science, biological science, or both. While a specific project may not explicitly use primatological and ethnographic or qualitative methods, we see this work as integral to an inclusive ethnoprimateology, as it contributes to a *collective* mixed-methods research program focused on the human–primate interface. While we believe combining quantitative and qualitative approaches is ideal, limiting the “ethnoprimateology” category to projects explicitly using mixed methods discounts so much of the research already classified as ethnoprimateology (in edited volumes and special issues) as well as much of the research we have highlighted in this review. We view these projects as key contributors to a new primatology that no longer conceptualizes primate behavior as occurring in a vacuum.

Conclusion

It appears that ethnoprimateology’s place at the intersection of disciplinary endeavors contributes to its esoteric status. Although just over 1% of papers considered in this 7-year systematic review used the term *ethnoprimateology*, it is clear that this theoretical approach is being used by contemporary primatologists. The presence of papers discussing issues often associated with ethnoprimateology—anthropogenic disturbance and conflict, tourism and crop raiding—indicates that the ethnoprimateological approach has much to offer across the discipline. In addition to this special issue of the

International Journal of Primatology, projected for publication in 2018, at least two special issues (“Primates in Anthropogenic Habitats” in the *International Journal of Primatology*, and “Using Ethnography in Primatology” in *Folia Primatologica*) and an edited volume (Dore *et al.* 2017) were published in 2017, highlighting the important contribution of ethnoprimateology to primatology. These efforts advance the conversation on what ethnoprimateology is and where it is going, and will continue to improve our understanding of the human–nonhuman primate interface.

Electronic Supplementary Material

The master spreadsheet containing bibliographical information, keywords, topical category, and presence/absence of the search terms for each reviewed paper is available as [supplementary material](#).

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